A critical appraisal of "Nonoperative Treatment of Elbow Ulnar Collateral Ligament Injuries With and Without Platelet-Rich Plasma in Professional Baseball Players."

By

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Abstract

This paper offers an appraisal of a 2019 article published in the American Journal of Sports Medicine about the nonoperative treatment of Ulnar Collateral Ligament (UCL) injuries in professional baseball players. An introduction to the clinical question that resulted in the selection appraisal of this article are followed by a description of the methods used to find this work. A summary of the work is compiled in the results section along with an appraisal of the introduction, methods, results, and discussion of the article. A discussion about the clinical significance and relevance of these findings is offered. Finally, there is discussion about the use of PRP injections and the application of these findings for future patients.

Key words: Platelet Rich Plasma (PRP), Ulnar Collateral Ligament (UCL), Nonsurgical, Professional Baseball.

Introduction

The focus of this search focused on UCL injuries that are common to baseball players and the treatment interventions for such injuries. The most well-known intervention for this injury is the Tommy John surgery. As a future clinician, I found it important to understand what nonsurgical alternatives existed for UCL damage. This led to research into platelet rich plasma (PRP) injections which is a popular nonsurgical intervention. This helped form the clinical question for this topic which became the following, "For baseball pitchers who are experiencing elbow pain due to a damage to their ulnar collateral ligament, are platelet rich plasma injections a viable alternative to the Tommy John procedure?"

Methods

My search for a research article pertaining to my question began on EBSCO, but also includes searches on the APTA and PubMed databases. The keywords that I used for this search included Tommy John, elbow, PRP injection, and nonoperative. Including the PRP injection search criteria helped refine my search to articles that were more specific to my clinical question. The inclusion criteria that I used included articles published within the past ten years and categorized as clinical trials or randomized clinical trials. After refining my search results, I had 32 articles to review.

After consolidating my search to three articles, I decided to focus on the one titled "Nonoperative Treatment of Elbow Ulnar Collateral Ligament Injuries With and Without Platelet-Rich Plasma in Professional Baseball Players." This article was led by Dr. Aakash Chauhan with several contributing authors and was published by the American Journal of Sports Medicine in 2019. This was a retrospective study with the focus of the study being athletes

playing professional baseball in the United States. I chose this article because the study is directly related to the clinical question that I have about effective nonoperative alternatives to the Tommy John procedure by comparing the effectiveness of interventions within the nonsurgical options.

Results

Summary of the study

UCL damage in the elbow this is a common injury found in baseball athletes. Outcomes after surgical intervention to repair this ligament is well studied and yields a return to play in a high number of the athletes who have surgical interventions. To date, there has not been significant comparison between the nonoperative treatment of UCL injuries with or without PRP injections in professional baseball players. This study is interested in the outcomes measures of a return to throwing, return to any level of professional play, and reinjury rate. Inclusion criteria for this study included being a professional baseball player, a diagnosis of UCL tear confirmed by a physician and an MRI, and an initial attempt of nonoperative treatment. Players who decided to undergo surgery immediately after their diagnosis were not included in the study. A total of 544 subjects were treated nonoperatively and were the focus of the study. Within the subject group, a total of 133 players received PRP injections as a part of their nonoperative treatment and 411 began rehabilitation without the PRP intervention. This was a matched cohort analysis study in which the subjects were matched due to their intervention type, position, age at time of injury, and throw handiness. Other variables to consider for a study such as this includes the grade of MRI tear and the type of PRP injection used by the physicians who opted to use it. Analysis of these groups found that the PRP group needed more rehabilitation time, took longer to return to throwing, and took longer to return to play than the non PRP group. These findings

tempter the recommendation that PRP injections should be used in the nonoperative procedure for treating UCL injuries among professional baseball players.

Appraisal of the study introduction

The introduction of this paper does a sufficient job of introducing the concepts discussed throughout the study by discussing the injury, how the injury is diagnosed, and the most common interventions. There is an adequate introduction to the PRP injection treatment and appropriate definitions of terms and abbreviations. The conclusion from the literature review gives a hypothesis that the players who receive PRP injections will have more positive outcome measures compared to the group who didn't receive injections. From my perspective, the references cited for this article seem credible. They all include authors and quite a few articles are cited from the American Journal of Sports Medicine which seems pertinent to this clinical question. The oldest citation from this article comes from 2001, however a large proportion of them were published after 2013.

A critique that I would make about the introduction is the description of the mechanism of injury due to the baseball throwing motion. The information is presented in such a way that would imply that their audience had a previous and proficient understand the baseball throwing process. That may be fair due to who might take interest in an article like this one, but to include scientists who may not be familiar with the mechanism, a more detailed description should be used.

Appraisal of the study methods

The methods section describes the retrospective cohort design type for this study. There is sufficient explanation of what subjects were included in the study and why some were excluded. This section gives detailed diagnostic criteria and an explanation of the many statistical tools used to analyze results.

A critique to offer about the methods is that due to the retrospective nature, there are limitations such as the inability to blind the subjects or clinicians. Although it seems like the subjects have similar demographics due to their shared occupation as professional baseball players, there are significant discrepancies such as age, ethnicity, and family history.

Appraisal of the study

The information in the results section is presented in a straightforward manner. The specific outcome measures found in the introduction and methods are each addressed explicitly in the results section. The results found that are statistically significant are bolded which is aesthetically helpful to the reader. Additionally, the results reported on are clinically meaningful and relevant for the participants of this study.

While presented well, the density of the information included can make the results difficult to follow and interpret based solely on reading this section. A formatting suggestion that I have would be to include grid lines separating the information presented in some of the tables. This would make it easier to read, especially when the table is busy because of the amount of information presented.

Appraisal of the study discussion

The results of this study did not support the hypothesis offered in the introduction and the discussion section does an adequate job of explaining that. The discussion expanded on the findings of the results section by adding commentary and explanation about why their initial hypothesis did not manifest. The discussion was well supported by existing literature from primary and credible sources.

This article names limitations of this study including the study being conducted retrospectively. Another limitation is the variety of PRP preparations, injection protocols, and rehabilitation programs. There is a consideration for the fact that this study covers a large number of baseball players who have a considerable difference in age, level of play, duration of play, onset of injury, duration of injury, and ligament injury grade. In this study, there are also a few possible confounding variables that were uncontrolled and could have potentially impacted results.

Discussion

The findings of this study are relevant to current PT practice in its role to help determine the most appropriate nonsurgical interventions in patients with UCL damage. It would be important to know what types of rehabilitation practices were used for patients in both groups. In the clinic, pairing the most effective intervention with a complementary rehabilitation program is imperative for advantageous results. This study is directly related to the clinical question that I have about nonoperative alternatives to the Tommy John procedure. This study focuses on the effectiveness of the PRP injections which is an increasingly common intervention to UCL damage. This study doesn't compare the effectiveness of surgical intervention to nonsurgical, but rather focuses on the interventions within the nonsurgical group. It would be important to

compare the outcomes of the surgical to the nonsurgical group to see if one was more efficacious.

PRP injections are intended to enhance the natural healing process of soft tissue such a ligaments and tendons. Clinicians may advocate for the use of PRP injections if it prevents an unnecessary surgical procedure. The results of this study suggest that within the nonsurgical group, the subjects who did not undergo PRP injections outperformed the PRP group. This would undermine the effectiveness of using PRP injections in cases that are deemed to be nonsurgical. Basically, either the injury is serious enough that a surgical repair is the most prudent option, or a nonsurgical rehabilitation plan can be effective that does not include the use of PRP injection. If the intended effect of PRP injections on soft tissue structures did prove to be effective, the benefits of using such treatment would be advantageous. RPR injections are not devoid of risk factors and some of them include local infection from the injection, painful reactions, and economic considerations. Based on the findings of this particular study, the risks do not outweigh the benefits since the treatment was not found to be particularly beneficial. Further research about what types of rehabilitation protocols would be most effective to use with PRP are needed to advance this clinical question. Finding such advantageous combinations could make the argument to use PRP injections more recommended if the results were suggestive of improved outcome measures compared to other nonsurgical interventions.

I am confident that the research was conducted with a high amount of validity due to the methodical approach to grouping subjects, the credentials of the authors conducting the study, and the recent publication from a reputable source. While the information of this paper was conducted with a high amount of validity, it would be difficult to translate these findings directly to patient care. The reason for this is the numerous unexplained variables that this study cannot

account for. The mechanism, grade, location of injury, and personal factors of each patient would all play factors in determining what type of nonsurgical intervention is best. This study is important in debunking the idea that any nonsurgical intervention involving the UCL needs PRP injections as part of the plan of care.

In conclusion, this study focused on the effectiveness of PRP injections as a nonsurgical option for UCL injuries. While this study was conducted validly, the findings of the results did not support the hypothesis that PRP injections are an effective choice. Awareness of the limitations of this study are important to consider, but the findings do tempter the notion that PRP injections should be a part of standard treatment. Further research into appropriate rehabilitation procedures paired with PRP injections could be explored.